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A METHOD FOR RETRIEVING FIRED PROJECTILES DURING THE DATA ACQUISITION TEST

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TECHNICAL REPORT

AIRCRAFT & AIR DEFENSE WEAPONS SYSTEMS DIRECTORATE

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This report contains information on how to construct and use an inexpensive bullet catcher. The device can be constructed from materials available at most lumberyards. Most small and medium caliber projectiles can be caught in an undamaged condition for examination as part of weapon development programs.

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FOREWORD

The "soft-catching" of small and medium caliber projectiles in an undamaged condition is frequently attempted as a part of ammunition and weapon development programs. Bullet traps for this purpose have often involved very expensive systems using water as the medium for absorption of the kinetic energy of the projectile without deformation of the projectile. This report describes a novel and inexpensive bullet trap that can be assembled from readily available materials and can be used in almost any testing range without special equipment.

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1. INTRODUCTION

It was necessary to construct an economical device to retrieve projectiles fired during the XM188/XM230 Data Acquisition Test (DAT) to be conducted during calendar year 1976. That test requires that the projectiles be caught during single shot firings from each barrel to determine the extent of engraving on the rotating band by the barrel. This allows an assessment of barrel wear during the test.

2. BACKGROUND

Experimental methods of retrieving fired projectiles at Rock Island Arsenal typically do not catch the projectiles softly enough that barrel engravings on the rotating bands are not altered by the retrieval medium.

The original idea for the method described in this report was furnished by the General Electric Company, Burlington, Vermont.

The objective of DAT is to acquire test data on performance characteristics and operational parameters of the XM188 and XM230 30mm aircraft weapons which are being developed for the Advanced Attack Helicopter, (AAH).

3. MATERIAL REQUIRED

Item	Quantity
Cartons, 12" x 28" x 36"	20
Insulation, Vermiculite plus styrene foam	32 bags
Lumber, 2" x 4" x 12'	8
Sawdust	150 ft^3
Nails, 10-penny sinker	2 lbs.

The total cost for the above materials was $130, excluding the cost of sawdust, which was supplied by the Arsenal carpenter shop.

4. EXPERIMENTAL PROCEDURE

The cartons were filled with a mixture of the insulation (50%) and sawdust (50%) (figure 1) and taped securely on all seams. Care must be taken to insure the sawdust does not contain any small chunks of wood. Small shavings in the sawdust will not damage the projectiles as they penetrate the mixture.

A wooden frame was constructed to hold the cartons on end and face-to-face (figure 2). When setting the filled cartons on the frame, it must be done gently so the mixture is not compacted into the lower end of the cartons, creating a varying density mixture which will deflect the projectiles out of the tops of the cartons.

After repeated firings into the cartons, tape can be used to cover the projectile holes in the carton faces (figure 3) to prevent spillage of the mixture inside.

Projectiles are recovered after firing by inspecting the cartons for penetration. The last carton penetrated can be removed from the line, opened, and the projectile sifted from the sawdust and insulation mixture. After retaping the carton, it can be placed in line again and a subsequent round fired. Undisturbed but penetrated cartons in the line need not be taped or disturbed, unless some of the mixture begins to spill out.

Figure 1. 50/50 Mixture of Insulation and Sawdust

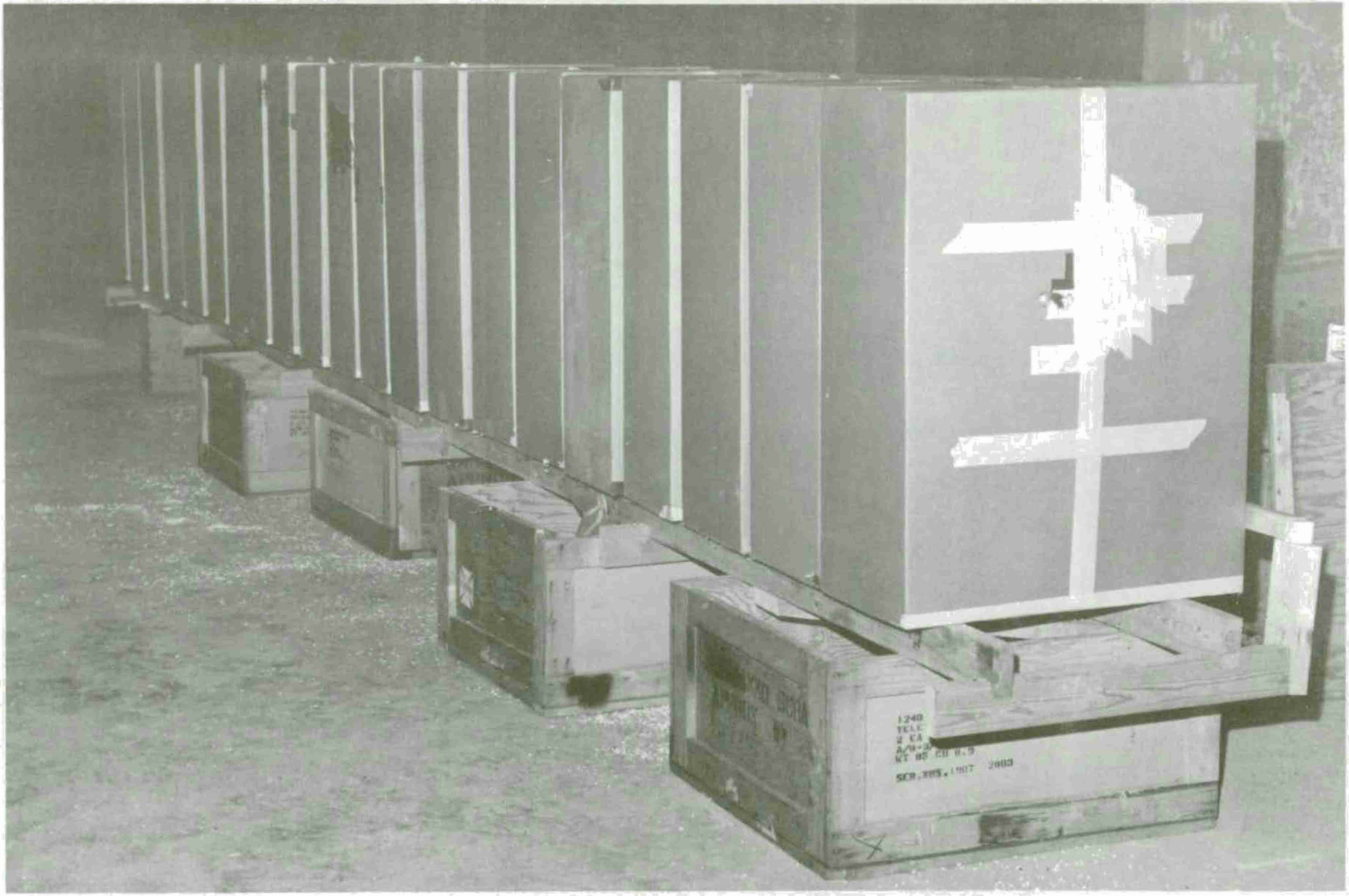

Figure 2. Projectile Recovery Device

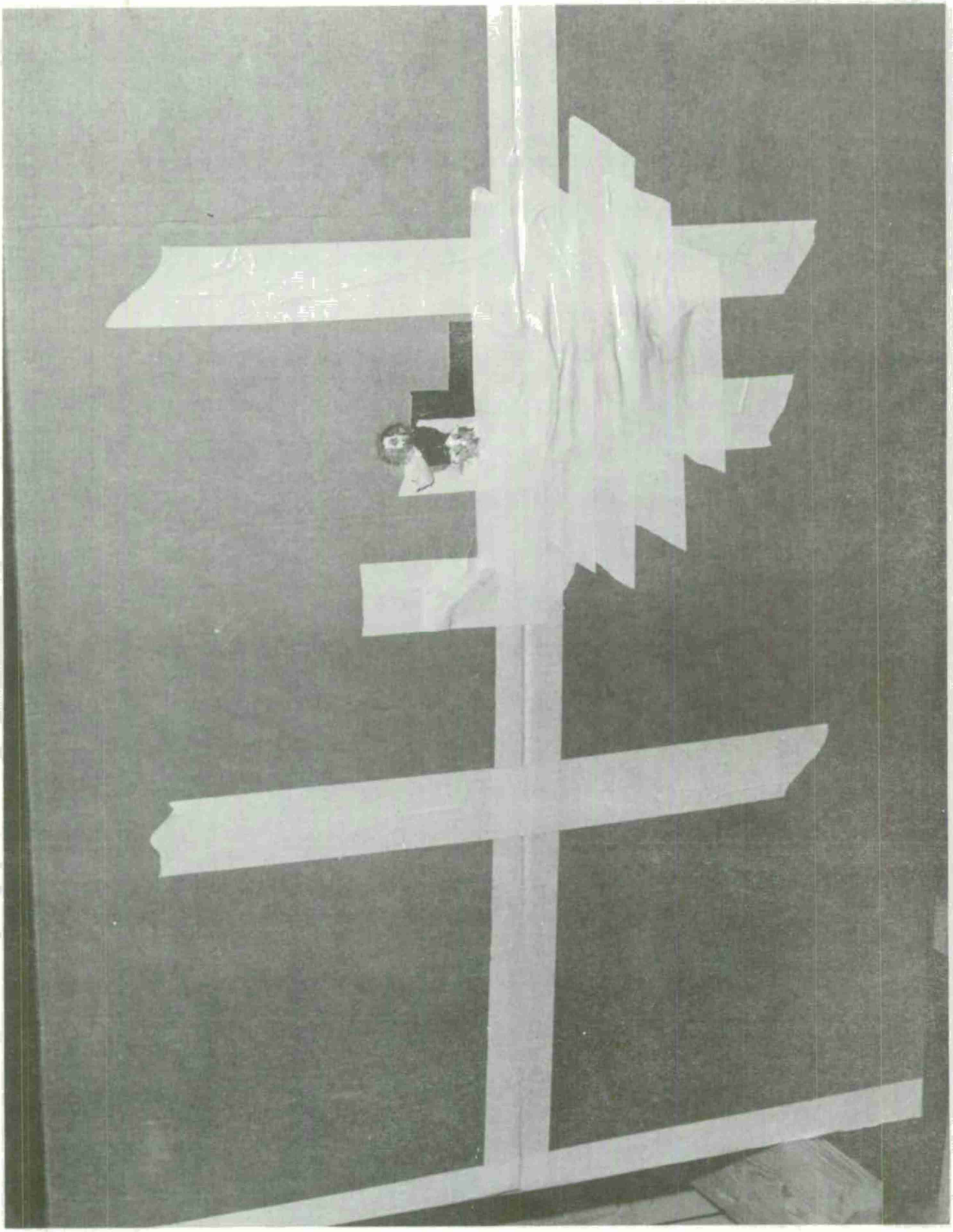

Figure 3. Projectile Recovery Device Showing Entry Holes After Firing

5. RESULTS

The recovery device was tested with 7.62mm (figure 4), 20mm (figure 5), and 30mm (figure 6) projectiles. These projectiles were in satisfactory condition after retrieval to determine the extent of barrel wear and sharpness of the rifling. The soft ogives on the 30mm rounds were lost in the mixture as they were torn into small fragments, some of which were found later, but this was not considered significant because the rotating bands and rifling marks were considered to be of prime importance.

A rotating band was lost from one 30mm projectile (figure 6, center) when it exited the line of cartons and impacted the range ceiling. One 20mm projectile received sand marks (figure 5), left) when it exited the line of cartons and landed in the firing butt. These two instances are considered insignificant, when the test can be repeated so easily.

6. CONCLUSION

The projectile recovery device worked successfully enough to be adopted for use during the XM188/XM230 Data Acquisition Test.

Figure 4. 7.62mm Projectile

Figure 5. 20mm Projectiles

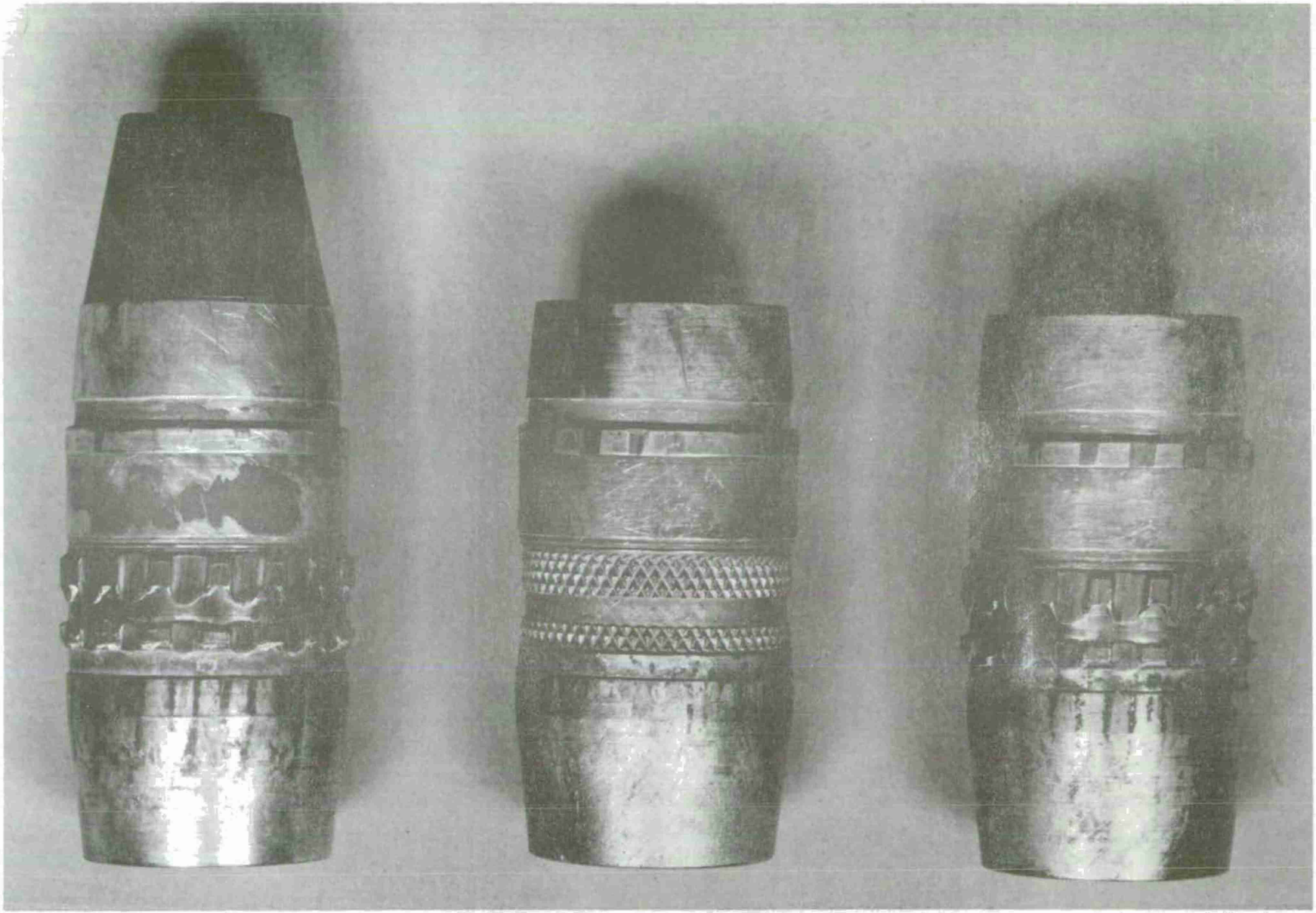

Figure 6. 30mm Projectiles

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2. Projectile Retrieval
3. Bullet trap

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